

**Notice of Allowability**

Application No.

10/717,419

Examiner

Allen C. Ho

Applicant(s)

SEGAWA ET AL.

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to amendment filed on 18 July 2005.
2. ☒ The allowed claim(s) is/are 1-16.
3. ☒ The drawings filed on 19 November 2003 are accepted by the Examiner.
4. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☒ All   b) ☐ Some\*   c) ☐ None   of the:
    1. ☒ Certified copies of the priority documents have been received.
    2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.  
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
  6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
    - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
    - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08),  
Paper No./Mail Date \_\_\_\_\_
4. ☐ Examiner's Comment Regarding Requirement for Deposit  
of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413),  
Paper No./Mail Date \_\_\_\_\_
7. ☐ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other \_\_\_\_\_

## DETAILED ACTION

### *Allowable Subject Matter*

1. Claims 1-16 are allowed.
2. The following is an examiner's statement of reasons for allowance:

With regard to claims 1-5, although the prior art discloses an x-ray controlling method comprising the steps of setting an upper limit of an x-ray exposure dose to the subject to be imaged and modulating a tube current of the x-ray tube so that the exposure dose does not exceed the upper limit, it fails to teach or fairly suggest the step of modifying the tube current based upon a ratio of the upper limit and a predicted value of the exposure dose as claimed.

With regard to claim 6, although the prior art discloses an x-ray controlling method comprising the steps of setting an upper limit of an x-ray exposure dose to the subject to be imaged, modulating a tube current of the x-ray tube so that the exposure dose does not exceed the upper limit, finding an exposure dose predicted value based on an imaging protocol, and modifying a tube current set value  $I$  in the imaging protocol when the predicted value exceeds the upper limit, it fails to teach or fairly suggest the step of changing the tube current set value  $I$  to  $I' = I(D_u/D_c)^{1/2}$  for each slice position, where  $D_c$  is the predicted value, and  $D_u$  is the upper limit as claimed.

With regard to claims 7-11, although the prior art discloses an x-ray imaging apparatus comprising a setting device for setting an upper limit of an x-ray exposure dose to the subject to be imaged and a modulating device for modulating a tube current of the x-ray tube so that the exposure dose does not exceed the upper limit, it fails to teach or fairly suggest a modulating

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device that modulates the tube current based upon a ratio of the upper limit and a predicted value of the exposure dose as claimed.

With regard to claim 12, although the prior art discloses an x-ray imaging apparatus comprising a setting device for setting an upper limit of an x-ray exposure dose to the subject to be imaged and a modulating device for modulating a tube current of the x-ray tube so that the exposure dose does not exceed the upper limit, the modulating device finds an exposure dose predicted value based on imaging protocol, modifies a tube current set value  $I$  in the imaging protocol when the predicted value exceeds the upper limit, it fails to teach or fairly suggest a modulating device that modifies the tube current set value  $I$  to  $I' = I(D_u/D_c)^{1/2}$  for each slice position, where  $D_c$  is the predicted value, and  $D_u$  is the upper limit as claimed.

With regard to claims 13-16, although the prior art discloses an x-ray imaging apparatus comprising a calculating device and a display device, it fails to teach or fairly suggest a calculating device configured to change a tube current based upon a ratio of a limit of the exposure dose and the historical exposure dose value as claimed.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

***Conclusion***

3. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

- (1) Toth *et al.* (U. S. Patent No. 6,904,127 B2) disclosed a system and method of medical imaging having default noise index override capability.
- (2) von der Haar (U. S. Patent No. 6,870,898 B1) disclosed a CT apparatus with automatic parameter modification to prevent impermissible operating states.
- (3) Nagaoka *et al.* (U. S. Patent No. 6,490,337 B1) disclosed an x-ray CT apparatus that controls x-ray tube current according to a three-dimensional model of the patient's body.
- (4) Bittl *et al.* (U. S. Patent No. 6,385,280 B1) disclosed an x-ray CT apparatus with modulation of the x-ray power of the x-ray source.
- (5) Popescu (U. S. Patent No. 5,822,393) disclosed a method for adaptively modulating the power level of an x-ray tube of a CT system.
- (6) Toth *et al.* (U. S. Patent No. 5,450,462) disclosed modulation of x-ray tube current during CT scanning with modulation limit.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Allen C. Ho whose telephone number is (571) 272-2491. The examiner can normally be reached on Monday - Friday from 8:00 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward J. Glick can be reached at (571) 272-2490. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Allen C. Ho  
Primary Examiner  
Art Unit 2882

26 August 2005